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"Maternal Child Attachment and Perinatal Depression"

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ABSTRACT

Traditionally, pregnancy has been thought of as a period of well-being and happiness. The pregnancy state itself has been thought to protect women from depression. However, women of child-bearing age frequently suffer from major depression. Approximately 10 to 15% of women experience a clinically significant major depressive episode during pregnancy or the early postpartum period. These prevalences predominantly reflect rates of depressive symptoms in developed countries; there is evidence that rates of depression change aspect widely in non-developed countries. In addition to the distress and impairment experienced by depressed women, depression during this time period is associated with further adverse outcomes for both mother and child. Women who experience perinatal depressive episodes are at increased risk for subsequent episodes of both postpartum and non-postpartum depression.

Anxiety symptoms are frequently reported by pregnant women and are often considered as part of the normal psychic experiences of pregnancy, especially if they are focused on the baby's health or on future maternal competencies.

The emotional image of the baby inside is what is called the mother fetus relationship.

Cranley (1981) describes the nature of mother's experiences as 'physical and kinesthetic awareness of the fetus', and an 'intellectual knowledge of her child'.

Nowadays, the concept of prenatal attachment is more accurately defined and it generally refers to the maternal–fetal relationship, which normally develops during the pregnancy; it represents the earlier internalized representation of the fetus that

both parents typically acquire and elaborate. Pregnancy can also represent a crisis period for many women, with manifest effect on antenatal attachment. Condon and Corkindale (1997) explore the hypothesis that feelings of anxiety or depression and lack of social support would be an interference issue in the development of maternal antenatal attachment. Women characterized by low attachment are associated with high levels of depression and anxiety, weak external social support, and high control and criticism in the partner relationship.

Antepartum depression is also common in women with a history of depressive illness, such that some researchers now believe pregnancy to be a risk factor for a mood disorder in those with such a history.

Despite the prevalence of depression during pregnancy and the growing body of literature associated with its treatment, whether pharmacologic or otherwise, large numbers of women are untreated.

Also “parental-fetal attachment” or perinatal term has been created to define the specific bond that parents develop towards the fetus during pregnancy. Since Winnicott’s (1958) concept of a pregnant woman’s “primary maternal preoccupation”, the quality of the parent-prenatal emotional bond has been considered as particularly important for the subsequent attachment relationship and for the infant’s psychological development. In 1981 Cranley defined the “maternal-fetal attachment” construct and created a tool to measure it. The author describes the nature of mother’s experiences as ‘physical and kinesthetic awareness of the fetus’, and an ‘intellectual knowledge of her child’. Nowadays a specific field of research which studies the characteristics of the emotional bond which parents-to-be develop is

progressively growing. Some aspects of current knowledge relating to development of prenatal attachment and the implication of low levels of prenatal attachment and risk to the fetus, is considered in this study.

Aim of the study:

The aim of this study was to assess the quality of maternal child attachment on mothers enrolled in post partum during the first month after delivery .The sample has been compared with a group of women enrolled during the first month of pregnancy and followed for twelve months like the sample of the previous study. Furthermore, we investigated the differences between the women enrolled in first month of pregnancy and after delivery. We tried to find a correlation looking at score on maternal attachment scale (MAAS) and a possible development of depression (EPDS ≥12), anxiety symptoms (STAI-Y ≥40). Even risk factors during pregnancy has been evaluated to assess the specific role of antenatal attachment as risk factor for depression (EPDS≥12), as anxiety symptoms (STAI ≥ 40) during pregnancy.

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Methods: The PND-ReScU II® study is a naturalistic longitudinal study deputated to found risks factors and a possible role of psychiatric and psychopathological prevention on perinatal disorders. This study has been performed in five Clinical Center in Tuscany (Italy) in cooperation with U.O. II Department of Psychiatry and Gynecology Department of the Azienda Ospedaliera Universitaria Pisana (AOUP). Women has been randomized and enrolled in the study during pregnancy on the first month and on the first month after delivery.

From January to August 2010 a sample of women (N= 946) by the Perinatal Research and Screening Unit (PND-ReScU). The Perinatal Depression-Research and Screening Unit (PND-ReScU) is based on an ongoing collaboration between the Department of Obstetrics and Gynecology and the Department of Psychiatry, Neurobiology, Pharmacology, and Biotechnologies of the AUOP. The primary aim of the PND-ReScU was to evaluate the effectiveness of screening for early identification and the intervention strategies to reduce and treat mood disorders in the perinatal period.

Furthermore, PND-ReScU aims were looking for individualized a battery of instruments that can be easily administered in a primary prevention setting.

Women were recruited for the study during pregnancy, at the time of delivery of the pregnancy book, or in the immediate post-partum period (during hospitalization). To have a significative relevance it was estimated to enroll 320 women during post partum period and 320 women during pregnancy. In June 2010, 491 women were recruited during post partum and at the end of August 2010 there were enrolled 455 women during pregnancy.

Instruments:

Symptoms of maternal depression were assessed using the 10-item Edinburgh Postnatal Depression Scale (Cox et al., 1987). The Post-partum Depression Predictors Inventory-Revised (PDPI-R) (Beck, 2002) was used to identify the risk factors for PPD. Prenatal and postnatalmaternal attachment were assessed using the Maternal Antenatal Attachment Scale (MAAS) and Maternal and paternal antenatal attachment scale (MPAS). Anxiety symptoms were assessed using STAI-Y (State Trait Anxiety Inventory form Y-1.)

Statistical analysis:

Data are presented as means (standard deviations), or percentages.

Chi-square tests were used to compare percentages and

ANOVA were used to compare mean scores.

Using analysis of variance (ANOVA) was able to compare two groups of data comparing the internal variability in these groups with the variability between groups.

To check the intensity and direction of the relationships between depression and maternal attachment to the fetus and risk factors, was performed Pearson bivariate correlation.

Analyses were conducted using SPSS, version 15.

Results:

Eligible women were 1363 , 455 (48%) recruited during pregnancy and 491 (52%) during post partum; among them, 417 (30,6%) refusedto partecipate in the study. The mean age in the first group G1 is 32.75± 4,84 and in the second gropu G2 is 33.39±4,81 years old, and in unrolled women (G3) is 32.5 ± 5.7 years old. Other sociodemographic variabilites had been evaluated and $\chi 2$ has been performed test fo find significant differences among the three groups. Most of the women of the three groups were married (G 1: n=381, 90.9%; G 2: n=389, 89.8%; G3 n=353, 87.2%); there were no differences in the groups ($\chi 2$= 8.48; p=0.01). Looking at the sample most part of women had Italian nationality bwhile unenrolled women showed almosty foreign nationality ($\chi 2$= 63.12*, p< 0,01) . 61.6% of the sample is composed of women at the first pregnancy.

A comparison between the scales administered for the two groups (G1, G2) was performed at the first month of post partum period at T4 during the first month of pregnancy (G1,T4; G2 T4 bis). The EPDS mean score s were 3,37 (±3,37) in the first group and the second group scored 6,3(±4,2; p=0.01) , the STAI mean scores were 45,4(±3,8) and 44,6(±3,7) in G1 and G2 respectively.

The PDPI-R mean scores were 27,5(±2,8) in G1 and 3,83 (±3,2) in G2 (p<.003) during pregnancy and 3.5 (±3.4) in G1 and 4.95(3,6) in G2 (p<.001) during post partum.

The average of the MAAS total scores at T2 (6° month of pregnancy) was 76.95 ± 6.3, while at T3(8° month of pregnancy) , the average was 78.54 ± 6.29.

Considering the MAAS T2 Preoccupation subscale the average is 28.12 ± 4.2 and 29.33 ± 4.21 at T3.

Considering the Quality of Attachment subscale MAAS, the average was 47.2 ± 3.29, and 47.71 ± 2.98 at T2 and T3 respectively. Correlation between depression during pregnancy, good antenatal attachment , anxiety symptoms and risk factors is reported for PDD during pregnancy

In our sample we don't find any association between antenatal maternal attachment and demographic characteristics except for women in their first pregnancy in which we discover higher MAAS scores than other women in sample.

Conclusions:

In the last five decades the study on the maternal attachment show a primary role for the future development of the newborn. For this reason it is essential that treatment providers in obstetric offices, primary care settings, and mental health clinics be attuned to the signs of anxiety disorders (Weisberg and Paquette, 2002). In our research we try to find the consequences of depression on newborns. We find a negative relationship between the develop of a attachment and depressive symptoms during pregnancy .

The quality of attachment in this record seems to be poor in mothers with depression and more risks factor for PDD during pregnancy.

In particular, as regards the analysis of the qualitative aspects of attachment in the second and third trimesters of pregnancy, the data confirmed a negative correlation between attachment, depressive symptoms and risk factors for the whole period of pregnancy.

Analysis of data for the period following childbirth, we found that women enrolled in the first month post-partum have an increased vulnerability to risk factors for developing postpartum depression than women enrolled in the first month of pregnancy , both with respect to the period of pregnancy ($p < .003$) that the postpartum period ($p < .001$); probably early screening and the role of caregivers in this study may have acted as protective factors.

Women enrolled in post-partum seem to have a different perception about respect to family support, support from friends and the partner, and seem to experienced

higher difficulties regarding health problems, sleep and temperament in the newborn. The women in group 2, as assumed from the data of PDPI-R, were significantly more depressed than in group 1, presenting an attachment toward their child's worst than the first group. Preliminary data of our study, which appear to be the first, to our knowledge, because explores both pregnant and post-partum periods, seem to confirm this assumption and emphasize the importance of an early screening of depressive phenomenal at the earliest stages of pregnancy.

INTRODUCTION

Epidemiological Date

Approximately 10 to 15% of women experience a clinically significant major depressive episode during pregnancy or the early postpartum period (Bennett, Einarson, Taddio, Koren, & Einarson, 2004b; Epperson, 1999; Gavin, Gayner, Lohr, Meltzer-Brody, Gartlehner, & Swinson, 2005; O'Hara & Swain, 1996). These prevalence estimates predominantly reflect rates of depressive symptoms in developed countries; there is evidence that rates of depression vary more widely in non-developed countries (Halbreich & Karkun, 2006). In addition to the distress and impairment experienced by depressed women, depression during this period is associated with further adverse outcomes for both mother and child. Women who experience perinatal depressive episodes are at increased risk for subsequent episodes of both postpartum and non-postpartum depression (Cooper & Murray, 1995).

Prenatal depression is associated with increased risk for negative birth outcomes, including preterm labor, low birth weight, and intrauterine growth restriction (Grote, Bridge, Gavin, Melville, Iyengar, & Katon, 2010). Maternal depression during the postpartum period is also a risk factor for a range of adverse child outcomes,

including behavioral problems and impaired cognitive development (Grace, Evindar, & Stewart, 2003).

Risk Factors of Perinatal and Postnatal Depression (PND)

Depression is the leading cause of disease-related disability among women. In particular, women of childbearing age are at high risk for major depression. Depression during the perinatal period can have consequences, not only for the women experiencing it but also for the women's children and family.

Perinatal depression encompasses major and minor depressive episodes that occur either during pregnancy or within the first 12 months following delivery. When referring to depression in this population, researchers and clinicians frequently have not been clear about whether they are referring to major depression alone or to both major and minor depression. Major depression is a distinct clinical syndrome for which treatment is clearly indicated.

Perinatal depression, whether one is referring to major depression alone or to either major or minor depression, often goes unrecognized because many of the discomforts of pregnancy and the puerperium are similar to symptoms of depression.

Another mental disorder that can occur in the perinatal period is postpartum psychosis. Unlike postpartum depression, postpartum psychosis is a relatively rare event with a range of estimated incidence of 1.1 to 4.0 cases per 1,000 deliveries. The onset of postpartum psychosis is usually acute, within the first 2 weeks of delivery, and appears to be more common in women with a strong family history of bipolar or schizoaffective disorder.

Reviews and meta-analyses published on postnatal depression (PND) estimate that in Western countries it affects 10% to 15% of women (Beck, 2001; O'Hara and Swain, 1996). Recently, meta-analysis of the Agency for Healthcare Research and Quality estimated that the prevalence of major or minor depression in pregnancy ranges from 8.5% to 10.0% while in the first postpartum year it ranges from 6.5% to 12.9% (Gaynes et al., 2005). These figures are comparable to those seen in non-childbearing women (O'Hara et al., 1991).

Although every woman is potentially at risk of developing PND, women who present specific risk factors have a significantly increased risk of becoming depressed after delivery. These risk factors are widely studied in literature (Kitamura et al., 1993; Glangeaud-Freudenthal and Boyce, 2003; Robertson et al., 2004) and meta-analyses (Beck, 2001; O'Hara and Swain, 1996) have been carried out to estimate the effect size of each of them. Currently, the known risk factors have been classified, according to their effect size, into three categories: strong-moderate, moderate, and small. The strongest predictors of PND are the experience of depression or anxiety during pregnancy or a previous depressive illness (Ryan et al., 2005; Robertson et al., 2004) and familiarity. In addition to these predictors, life stress and lack of social support have a moderate-severe effect size; psychological factors and marital problems have a moderate effect size, while obstetric factors and socioeconomic status have a small effect size (Robertson et al., 2004).

Moreover, in most studies there were methodological limitations such as small sample sizes and the lack of adjustment for confounding factors. In particular, most studies did not take into account the strong co morbidity between mood disorders

and anxiety disorder, and thus did not investigate whether pregnancy AD could increase the risk of PND, regardless of the existence of pregnancy depression.

In a large sample of women Sutter-Dallay (2004) assessed whether pregnancy AD is an independent risk factor for the occurrence of intense postnatal depressive symptoms; these authors found that women presenting pregnancy AD were four times more likely to present also postnatal depression at the 6th week, than those without. Further, as literature suggests, no studies have examined the predictive role of perinatal depression and maternal attachment except for insecure style attachment that can develop after child birth.

Treatments for post partum depression

Given the prevalence of perinatal depression and the adverse effects this disorder has on women and their children, the identification of effective treatments for this disorder has important public health implications. Although there is a great evidence for the efficacy of both antidepressant medication and psychological interventions for depression (Joffe, Sokolov & Streiner, 1996 and Cuijpers, van Straten, Andersson, & van Oppen, 2008)

For example, in an attempt to limit fetal exposure, antidepressants may be prescribed below therapeutic dosage levels (Bennett, Einarson, Taddio, Koren, & Einarson, 2004a).

This problem is complicated further by the fact that most women actually require higher doses of antidepressant medication during pregnancy (Dawes &

Chowienczyk, 2001; Hostetter, Stowe, & Strader, 2000; Wisner, Perel, & Wheeler, 1993). Concerns regarding effects of infant exposure to antidepressant medication via breast milk may also lead clinicians to prescribe inadequate doses of these medications during the postpartum period (Epperson, Anderson, & McDougle, 1997; Epperson, Jatlow, Czarkowski, &

Anderson, 2003). Biological and psychosocial changes that occur in the context of pregnancy and parenting, including sleep deprivation, disruptions to the hormonal balance, alterations to HPA axis functioning, and changes to interpersonal relationships, introduce challenges that may affect the efficacy of both pharmacological and psychotherapeutic interventions (Dennis & Ross, 2005; Kammerer, Taylor, & Glover, 2006). Efficacy of psychological interventions for depression may also be reduced among women who have had previous pregnancy losses, complications, or traumatic deliveries, as they may experience post-traumatic stress disorder or other co morbid anxiety disorders (Forray, Mayes, Magriples, & Epperson, 2009).

There are also differences in the acceptability of interventions, particularly among women who are pregnant or breastfeeding: the majority of women indicate a preference for psychological interventions to antidepressant medication during both pregnancy and the postpartum period, and the overall acceptability of antidepressant medication among these groups is low (Chabrol, Teissedre, Armitage, Danel, & Walburg, 2004; Kim et al., 2011). Thus, identification of efficacious interventions, particularly psychological interventions, for this population is an important and growing area of research.

Two meta-analytic reviews of psychological treatments for postpartum depression

have found these interventions to be superior to routine care or control conditions. A Cochrane review of psychological and psychosocial interventions for postpartum depression found that, compared to routine care, these interventions were associated with a 30% reduction in relative risk for depressive symptomatology (Dennis & Hodnett, 2007).

Cuijpers, Brännmark, and van Straten (2008) conducted a meta-analysis of 17 studies in which a psychological intervention initiated during the postpartum period was compared to a control or active treatment condition. They reported that psychological interventions were superior to control conditions, with an overall effect size in the moderate range.

Many studies of interventions for this population are either open trials or do not include a treatment control condition, we chose not to restrict these analyses to studies in which interventions were compared to a control condition. However the possibility that effect sizes calculated from these studies may reflect natural symptom remission over time, we also compared active treatments to control conditions in studies where it was possible to do so.

The Maternal Attachment

In the last two decades, psychologists had progressively structured the concept of the mother–fetus relationship as the complex emotional internal image of the unborn baby, that the mother acquires and increments throughout her pregnancy (Rapheal-Leff, 1986; Righetti, 1996; Righetti & Sette, 2000; Stainton, 1985). Cranley (1981) describes the nature of the mother's experiences as 'physical and kinesthetic awareness of the fetus', and an 'intellectual knowledge of her child'.

Nowadays, the concept of antenatal/prenatal attachment is more accurately defined (Righetti, 2003) and it generally refers to the maternal–fetal relationship, which normally develops during pregnancy; it represents the earlier internalized representation of the fetus that both parents typically acquire and elaborate.

Condon (1993) suggests a way of understanding attachment in terms of quality of the affective experiences (closeness/distance, tenderness/irritation, pleasure in interaction, distress at fantasized loss, and conceptualization of the fetus as a 'little person') and intensity of preoccupation (amount of time spent thinking about, talking to, dreaming about or palpating the fetus).

Researchers have demonstrated that prenatal attachment develops regardless of maternal age (Bloom, 1995), although middle-aged women aged over 35 show significantly lower prenatal attachment scores. Furthermore, no significant differences are found in prenatal attachment levels between primiparous and multiparous groups of women (Condon & Esuvaranathan, 1990).

The favorable prospective use of antenatal attachment is underlined by Condon's statements (1997): 'Maternal–fetal attachment is of a potential significance from both theoretical and clinical perspectives. It represents the development of the

earliest, most basic form of human intimacy involving an object characterized by a curious admixture of fantasy and reality.'

Pregnancy can also represent a critical period for many women, with manifest effect on antenatal attachment. Condon and Corkindale (1997) explore the hypothesis that feelings of anxiety or depression and lack of social support would be an interference issue in the development of maternal antenatal attachment. Women characterized by low attachment are associated with high levels of depression and anxiety, weak external social support, and high control and criticism in the partner relationship. From a clinical perspective, the incidence and the implication of low levels of prenatal attachment are also investigated; approximately 8% of women develop minimal attachment to their unborn child (Condon, 1986; Condon, 1987). Pollock and Percy (1999) found an association between the low attachment group and self-reported risk to the fetus and dimension of personality disorder. Thus, it seems not implausible that the antenatal attachment may be of critical importance for the early mother–infant relationships.

Maternal feelings and sensitivity towards the child develop continuously throughout pregnancy (Leifer, 1997), and a loving relationship with the fetus would continue to be a good, sensitive interaction postnatally. In a study of 100 pregnant mothers, Siddiqui and Hagglof (2000) indicate that mothers who experienced greater affection during pregnancy and fantasized more about the unborn babies at about 12 weeks postpartum, showed more overall involvement during interaction, in particular

in stimulating their infants. Consequently, interventions which result in better antenatal attachment may have durable positive consequences.

The role of antenatal care, ultrasound scanning technique in particular, has not been satisfactorily investigated, although fetal ultrasound screening has progressively become routine practice in many countries. Studies from the early 1980s (Reading, Cox,

Sledmere, & Campbell, 1984) demonstrated that women liked the moving image of scans, above all 'seeing the baby on scan is a high spot of the pregnancy, an event to be shared with the baby's father and siblings' (Marteau & Richards, 1996, p.122). In fact, women generally consider ultrasound a pleasant experience and one of the best aspects of their antenatal care (Brown, Lumley, Small, & Astbury, 1994); moreover, women and their partners find ultrasound very attractive because it offers a visual confirmation of pregnancy, and it represents a new form of contact with the unborn baby (Clement, Wilson, & Sikorski, 1998).

Perinatal depression and pregnancy outcome

Depression, anxiety symptoms and maternal stress can lead to adverse effects in the fetus and offspring. Untreated depression can lead to harmful prenatal health behaviors such as poor nutrition, poor prenatal medical care, smoking, alcohol or other substance misuse and risk of suicide, each of which compromises the health of both the woman and her fetus. Untreated depression during pregnancy increases the risk for PPD, which has known negative effects on maternal--infant attachment and child development. In a pregnant woman with depression, the fetus can demonstrate abnormal neurobehavioral responses such as altered heart rate reactivity. These complications include preeclampsia, preterm delivery, low birth weight, miscarriage, small-for-gestational-age babies, low Apgar scores, neonatal complications and high neonatal cortisol levels at birth. However, recent studies have suggested that, with adjustment for potential

confounding prenatal variables, untreated depressive symptoms during pregnancy may not be associated with lower birth weight or younger gestational age and preterm delivery

As reviewed, antenatal stress and depression have also been correlated with elevated cortisol levels, language and cognitive impairment, impulsivity, attention-deficit disorder, behavioral dyscontrol and psychopathology in offspring during childhood.

A recent study reported that high levels of prenatal anxiety and depression were associated with more sleep problems in children at 18 and 30 months. Hypotheses about the influence of maternal stress and depression on obstetric variables (e.g., preterm delivery) and later childhood development include elevated placental levels of corticotropin-releasing hormone and cortisol, alterations in immune function, increased catecholamines and uterine vascular changes.

studies on attachment

There is no real evidence on how maternal-fetal attachment (MFA) compromises the course of pregnancy (Grace, 1989) and can establish the basis of mother-child relationship in the post-partum (Siddiqui et al, 2000; Muller, 1993; Fuller, 1990). Moreover, as mentioned above, the relationship that develops between the two can significantly influence the social, emotional and cognitive development of the child (Ainsworth, 1979, Ranson et al, 2008). For these reasons, it is essential to investigate the factors that influence perinatal attachment and their associations in the post-partum mother-infant relationship.

Through the use of scales of measurement of the area experienced prenatal attachment parenting to the child starts expected to be systematically investigated.

A longitudinal study on maternal-fetal attachment during the first, second and third

trimesters of pregnancy, highlighted an important aspect upon all pregnant women who enjoy good health: from the second quarter, regardless of age, the mothers appear to be progressively more attached to their children as the pregnancy progresses (Laxton-Kane & Slade, 2002; Cannella, 2005). This increase seems to be connected to the first perception of fetal movements, in addition, women more sensitive to fetal movements are the same ones that get the highest scores in attachment to the fetus (Heidrich & Cranley, 1989).

Recently, from 2002-2007, has been developed a study to examine the impact of major depression maternal-fetal attachment (McFarland et al, 2011). This study was the first which tried to underline that major depression during pregnancy remarks negatively with the AMF (LR) = 4.58, df = 1, $p < 0.04$), suggesting that the basis of inadequate maternal-infant attachment in the post-Depression partum may have its roots in pregnancy.

Studies published in the literature about the association between prenatal depression and MFA are inconsistent and the nature of this association remains unclear.

Discrepant data found in the studies may be correlated with methodological problems, which include limitations in the way that the depression has been evaluated.

Recently, Yarcheski et al (2009) have developed a meta-analysis of predictors of MFA, which included 15 empirical studies that examined the relationship between depression and the AMF. The results of the meta-analyzes have indicated that although depression proves a predictor of MFA, the effect size was low. However, to date, besides the study of McFarland et al (2011), are not reported in the literature other studies that have investigated the relationship between the DM and the AMF, and especially that they

have clarified the nature of this relationship and examined 'impact of the MFA treatment of depression, such as postnatal consequences of inadequate prenatal attachment in women with depression.

AIMS OF THE STUDY

The objective of this thesis was to evaluate the quality of mother / child first month after delivery in women enrolled in post partum compared with a group of women enrolled in the first month of pregnancy, paying attention to level of anxiety and depression , and to risk factors of developing a post-partum depression.

The data are drawn from a larger study aimed at the assessment of risk factors and effectiveness of preventive psychological, psychiatric and social psychopathology of perinatal (PND ReScU ®-II).

METHODS

Participants

Pregnant women and post partum women was recruited from a study conducted at Pisa in the framework of the Perinatal Research and Screening Unit Study (PND-ReScU). The Perinatal Depression-Research and Screening Unit (PND-ReScU) is based on an ongoing collaboration between the Department of Obstetrics and Gynecology and the Department of Psychiatry, Neurobiology, Pharmacology, and Biotechnologies of the Azienda Ospedaliera Universitaria Pisana. The primary aim of the PND-ReScU is to evaluate the effectiveness of screening for early identification and the intervention strategies to reduce mood disorders in the perinatal period. Furthermore, PND-ReScU aims at defining a battery of instruments that can be easily administered in a primary prevention setting strategy. The women enrolled in this study were recruited during pregnancy when the pregnancy book was delivered to them. To enhance our recruitment we wrote a letter to be given to each pregnant woman who came to the local health service to receive a booklet of information issued by the region of Tuscany describing the various aspects of pregnancy and maternal health. This letter was meant to provide a brief description of perinatal depression and inform women about the possibility of participating in a study aimed at evaluating risk factors for this condition. The Study recruitment began in September 2009 and ended in August 2010.

Study should last 24 months with a recruitment period of 6 months.

Criteria to be included in the study it was request to be capable to sign an informed consent statement and be available to be contacted by phone.

Exclusion criteria for the study were : age ≤18 years, poor knowledge of the Italian

language or other limitations to communication, no fixed residence.

The Ethics Committee of the Azienda Ospedaliera Universitaria Pisano approved the study protocol and the assessment procedures. The Committee also required the provision of psychological counseling for women with mild depressive symptomatology and/or for all women who requested it. Provisions of drug treatment for women with moderate/severe depression, were also provided according to international guidelines (U.S. Food and Drug Administration, 1979; American Academy of Pediatrics, 2000). All subjects were written in the informed consent providing participants with a full description of the study and the opportunity to ask questions. The Ethics Committee allowed us to collect information only after the informed consent statement was signed, as prescribed the Italian law (art. n. 675 of December 31, 1996) on privacy. Therefore, socio-demographic characteristics of women who refused to participate in the study are available. This study was supported by the Italian Ministry of Health.

Screening

All women enrolled in the study fill out some screening test to try to find specific risk factors for the onset of anxiety-depressive symptoms during the perinatal period (Postpartum Depression Predictors Inventory-Revised, PDPI-R; Beck, 2002) and to evaluate the possible presence of expressed and subthreshold symptoms of depression (Edinburgh Postnatal Depression Scale, EPDS, Cox et al, 1987) or anxiety (State-Trait Anxiety Inventory, STAI, Spielberger et al, 1993) . Maternal attachment during the prenatal period was evaluated with the Maternal Antenatal Attachment Scale (MAAS) (Condon, 1993) and in the postpartum with the Maternal Postnatal Attachment Scale (MPAS) (Corkindale & Condon, 1998).

This scale has been constructed ad hoc, on the basis of the literature, to evaluate the attachment and will be validated during the study.

Screening tests for pregnant women / mothers were in self-administered mode, consisted of a limited number of items, were easy to understand and fast to fill in (about 10 minutes each). Each questionnaire has good sensitivity and specificity to investigate the existing risk factors for disease of the perinatal period (prediction of postpartum depression PDPI-R match up to 83% dose to the first month post-partum; dell'EPDS the sensitivity is 86% for a cut-off greater than 12).

If test screening during pregnancy scored an EPDS ≥ 13, a STAI score ≥ 40, PDPI-R≥ 4 or a previous depression (assessed with a specific item of PDPI-R), were administered sections regarding Anxiety and Mood Disorders of Structured Clinical Interview for Axis I (SCID-I; First et al, 1995).

The sample recruited during the first month of pregnancy was divided into two arms:

A) The first one with positive screening for risk factors (PDPI R-positive, pre-existing depression assessed with a specific item of PDPI-R and / or EPDS ≥ 13 and / or STAI ≥ 40). In this specific cases followed the assignment to psychotherapy and / or appropriate medication and conducting the assessment scales PDPI-R, EPDS, STAI during the third, sixth, eighth month of pregnancy and during the telephone control I, III, VI, IX, XII months post-partum, the MAAS was administered during the sixth and the eighth month of pregnancy, while during the MPAS, sixth and twelfth months post-partum.

B) negative screening for risk factors in pregnancy: telephone monitoring during the sixth and eighth month of pregnancy and during the first and sixth months postpartum, using the feedback PDPI-R, EPDS, STAI, MAAS / (MPAS control

population).

Women with EPDS score ≥ 13 or STAI score ≥ 40 were assessed with the Mood and Anxiety sections of the SCID-I, and was also a proposal to psychotherapy and / or appropriate pharmacological treatment.

The sample recruited during the first month post-partum was divided into two arms:

C) women who showed positive score for risk factors (PDPI R-positive, pre-existing depression assessed with a specific item of PDPI-R and / or EPDS ≥ 13 and / or STAI ≥ 40): assignment to psychotherapy and / or appropriate medication and conducting the assessment scales PDPI-R, EPDS, STAI during the I, III, VI, IX, XII months post-partum, the MPAS was administered during the first, sixth and twelfth months post-partum.

D) negative screening for risk factors in the puerperium: telephone monitoring during the sixth month post-partum by PDPI-R, EPDS, STAI, MPAS (control population).

Women with EPDS score ≥ 13 or STAI score ≥ 40 were assessed with the Mood and Anxiety sections of the SCID-I and was offered a psychotherapy and / or appropriate medication.

In this way consist of four groups of women evaluated (Figure 1):

1) women with risk factors present at the screening around the first trimester of pregnancy (arm A);

2) positive risk factors women present at the screening on the first month post-partum (arm C);

3) free risk factors women to screening carried during the first trimester of pregnancy (telephone monitoring during the sixth and eighth month of pregnancy

and the first and sixth months post-partum) (arm B) and around the 1st month post-partum (telephone monitoring during the sixth month post-partum) during the entire period of the study (arm A);

4) women who have not agreed to participate in the study, was gently asked to sign an agreement to evaluated sociodemographic data.

Lack of interest or psychopathology disorder, women who had tested negative at the first screening and for which the gynecologist, general practitioner, the obstetrician, the pediatrician pointing to a specific need could benefit care services provided by the study without being part of 'statistical processing.

In women belonging to the arm A and C, positive screening, assessment (EPDS, STAI, PDP-R) were performed, as well as to the timing of the protocol (III, VI, VIII months pregnant and I, III, VI , ninth and twelfth months post-partum) at each scheduled clinical control. The measure of response was defined through the course of depressive symptomatology, as measured with the score dell'EPDS: ≥ 13 EPDS for the reduction of 4 points and the descent below the cut-off of 13 was index of remission in case of EPDS > 13 the reduction of 4 points without the descent below the cut-off of 13, was an indication of response to treatment, an increase of 4 points compared to baseline score was an indication of deterioration.

Instruments

Several instruments were administered to evaluate a broad range of different aspects related to the perinatal period that might represent potential risk factors for the development of PND.

Symptoms of maternal depression were assessed using the 10-item Edinburgh Postnatal Depression Scale (Cox et al., 1987). Originally designed as a screening instrument for postnatal depression, the EPDS has been since then validated for use during pregnancy (Murray and Cox, 1990). The EPDS is a 10-item self-report scale designed as a screening instrument for postnatal depression but has also been validated in non-postnatal women (Cox et al., 1987). Each item is scored on a four-point scale (0–3), the minimum and maximum scores being 0 and 30, respectively. Five of the items explore dysphoric mood, two explore anxiety and three assess guilt and suicidal thoughts. The total is calculated by summing up the item scores. A score of 13 and above is used to identify probable cases with a sensitivity of 86% and a specificity of 78% (Cox et al., 1987). The scale does not provide a clinical diagnosis of depression, but a score above 13 is widely used to indicate the presence of probable depressive disorder. The EPDS rates the intensity of depressive symptoms present over the previous 7 days (see Appendix 2 for a description of the items). A cut-off score of 13 has been found to identify most seriously depressed women, although in case of a score of 9 or more, clinical assessment has been recommended (Cox et al., 1983). In 1992, the EPDS was translated into Italian and was found to have good psychometric properties (Carpiniello et al., 1997). When women exceeded the threshold score (total scores

≥13) of EPDS, suggesting the probable presence of depression, we have re-administered section A of SCID to confirm the diagnosis of depressive disorders. Scores on EPDS item 3, “blamed myself unnecessarily”, item 4, “anxious or worried for no good reason”, and item 5, “scared or panicky for no very good reason”, were extracted for further analysis. These items were clustered as “Anxiety EPDS”. Scores on EPDS item 1, “I have been able to laugh and see the funny side of things”, item 2, “I have looked forward with enjoyment to things”, and item 8, “I have felt sad or miserable”, were extracted for further analysis. These items were clustered as “Depression EPDS”.

Information on socio-economic status was drawn from the Postpartum Depression Predictors Inventory-Revised (PDPI-R) (Beck, 2002), which is a self-report instrument designed to identify the risk factors for postpartum depression. The PDPI-R categorizes socio-economic status on 3 levels: -low, medium, and high, without providing anchor points related to the income per year. The 13 PDPI-R factors are (1) marital status, (2) socio- economic status, (3) self-esteem, (4) prenatal depression, (5) prenatal anxiety, (6) unwanted/unplanned pregnancy, (7) history of previous depression, (8) social support, (9) marital dissatisfaction, (10) life stress, (11) childcare stress, (12) infant temperament, and (13) maternity blues. The first 10 predictors comprise the prenatal version of the PDPI-R. The last 3 risk factors are specific to the postpartum period. The total score on the prenatal version of the PDPI-R ranges between 0 and 32, while the PDPI-R Full Version (Prenatal plus Postpartum Versions) is used after delivery and includes all 10 factors of the Prenatal Version plus three additional risk factors: childcare stress, infant temperament and maternity blues. The total score of the Full Version ranges

between 0 and 39 (Beck et al., 2006). The higher the score, the more risk factors for PPD a subject has.

Anxiety symptoms were assessed using STAI-Y (State Trait Anxiety Inventory form Y-1. Self report measures of state and trait anxiety are regularly used in studies with childbearing and, in the last time, validated for use with pregnant and postnatal women (Grant et al., 2008). STAI-Y is a self-administrated test that is composed by 2 parts: the state anxiety scale consist of 20 items that evaluate current feelings of tension and anxiety, while the 20-item trait scale assesses anxiety levels in general.

Scores over 40 on both the state and trait scales were adopted; this value corresponding to the point at which false positive and negative results were minimal (Barnett and Parker, 1986; Hart and McMahon, 2006).

Maternal attachment was assessed using the Maternal Antenatal Attachment Scale (MAAS). These 19-item (for mother) scales consist of two underlying dimensions: the quality and the preoccupation of antenatal attachment derived from factor analysis studies. The first dimension refers to affective experiences and positive feelings about the fetus, the second one assessed the intensity of preoccupation with the fetus, such as the strength of feelings, the amount of time spent thinking about or dreaming about the baby. Participants' responses are made on 5-point scales: the higher values designate a good antenatal attachment. Generally, higher scores for both the sub-scales indicate the most adaptive mother–fetus attachment style.The Italian version of this scale has been validated by Righetti (2005), the MAAS was administered to the sixth month and eighth month of pregnancy.

Maternal Postnatal Attachment Scale (MPAS)

The maternal attachment in the postpartum period was assessed using the scale postnatal maternal attachment, Maternal Postnatal Attachment Scale (MPAS) (Condom & Corkindale, 1998), administered to the first, the sixth and twelfth month after childbirth. This scale is structured like the MAAS and has a section for the variable concerned and a section on the quality of attachment.

The entire protocol of our study is summarized in Table 1.

Statistical analysis

Data are presented as means (standard deviations), or percentages.

Chi-square tests were used to compare percentages and ANOVA were used to compare mean scores.

Using analysis of variance (ANOVA) it was possible to compare two or more groups of data comparing the internal variability in these groups with the variability between groups.

Furthermore, the relationship between anxiety, depression, risk factors and maternal attachment during pregnancy were analyzed using a bivariate correlation model

Analyses were conducted using SPSS, version 15.

.RESULTS

Demographic characteristics of the sample study

Demographic characteristics of pregnant women are provided in Table 2.

The sample size is inspired from literature (Gaynes et al, 2005) showing a prevalence period ranging from 6.5% to 12.9% of women with clinically significant depressive symptoms in the first year post-partum.

In the study ReScU PND-I results in a sample of women recruited to the third month of pregnancy which attended psychological counseling or drug treatment if needed, a prevalence of major depression or minor in the post-partum 6.1% (Banti et al, 2011). Based on these results, it was estimated that it was necessary to recruit about 320 pregnant women, and about 320 women during the first month post-partum. This calculation was based on the extreme low end of the 95% proportion of 6.5%, then it can be considered a conservative estimate.

From January to August 2010 was conducted a recruitment in the Area of Pisa and Valdera, at the Pisa Units I and II of Obstetrics and Gynecology of the University Hospital and in collaboration with the Department of Obstetrics and Gynaecology 'Lotti hospital in Pontedera (Pisa). During the eight months the protocol has been showed to 1363 women. Subsequently, we enrolled 946 women (69.4%). The percentage of denial was 30.6% (n = 417).

In June 2010 we reached the sample size requested for group 2, recruited in the post-partum period. This sample amount to 491 mothers, while in August 2010 has reached the predetermined sample size for group 1, recruited during pregnancy of 455 women pregnant.

Actually patients who performed the assessments to the first month post-partum were 455 for group 1 (sample enrolled during the first month of pregnancy), 136 of which completed the assessments until T4 (the first month post-partum) of 491 women recruited in Group 2 (sample enrolled in the first month post-partum), 271 have returned the evaluation T4 a (first month post-partum) (Figure 2).

Groups 1 (enrolled during pregnancy) and 2 (enrolled in the first month post-partum) and the group of women who attended the study were analyzed using the $\chi 2$ test to compare the demographic characteristics. The EPDS and STAI scores scales to the first month post-partum groups 1 and 2 were compared with student's t test for independent samples, and $\chi 2$ test was used to evaluate the percentages of women exceeded the cut-off EPDS ≥ 13 and ≥ 40. It was calculated odds ratios (OR) with confidence intervals (CI) at 95%. $\chi 2$ test was performed to evaluate Risk factors of the dichotomous PDPI-R in the two groups, for those not dichotomous the Student t test for independent samples.

Analysis of variance (ANOVA) it was possible to compare two or more groups of data by comparing the internal variability in these groups with the variability between groups.

Furthermore, the relationship between depression, risk factors and maternal attachment during pregnancy, was analyzed using a model of bivariate correlation.

The analyzes were performed using SPSS, version 15.

Sociodemographic characteristics of the sample vs. women who have refused to participate in the study are provided in Tab 1.

First of all, we compared the sociodemographic characteristics of patients included in the study (n = 946, 69.4%) with the sociodemographic characteristics of patients which for various reasons refused to participate (n = 417, 30.6%) (Table 1).

The mean age of group 1 was 32.75 (± 4.84), and the group 2 was 33.36 (± 4.81), denial percentage was 32.58 (± 5.70). To assess if there were three different age groups had been conducted one-way analysis of variance. We did not detect any statistically significant difference among the three groups (F = 2.62, P = 0.07).

Subsequently, we studied other sociodemographic variables, and the $\chi 2$ test was performed to assess whether the three groups there was a significantly different distribution. Regarding marital status, most of the three groups of women had married / cohabiting (group 1: n = 381, 90.9%, group 2: n = 389, 89.8%; waste: n = 353, 87.2%) is not however, no difference was detected in the three groups ($\chi 2$ = 8.48, P = 0.21).

Women of all three groups lived predominantly in urban area (total: n = 579, 46.7%, group 1: n = 176, 42.5%, group 2: n = 218, 50.8%; denial: n = 185, 46.6%) or suburban (total: n = 624, 50.3%, group 1: n = 225, 54.3%, group 2: n = 200, 46.6%; refuses: n = 199, 50.1%), women who lived in a rural area represented a small minority (total: n = 37, 3.0%, group 1: n = 13, 3.1%, group 2: n = 11, 2.6%;refuses: n

= 13, 3.3%) . There were no statistically significant differences between the three groups (χ2 = 6.0, P = 0.19).

Regarding the education, there were a statistically significant difference between the women ongoing in the study and those who refused to participate (χ2 = 99.64, P <.001): women who had not joined the study showed in fact low education , no high school diploma (group 1: n = 206, 49.4%, group 2: n = 210, 48.7%; refuses: n = 112, 28.6%) more probability to have a middle school (group 1: n = 74, 17.7%, group 2: n = 67, 15.5%; refuses: n = 163, 41.7%), although the number of graduates did not differ significantly among the three groups (group 1: n = 132, 31.7%, group 2: n = 151, 35.0%; refuses: n = 115, 29.4%).

Regarding employment, most of women of the group had an employee (total: n = 753, 60.1%, group 1: n = 262, 62.7%, group 2: n = 263, 60.7%; waste : n = 228, 56.7%).

The only difference in three groups was that women who had not participated in the study were housewives (χ2 = 28.1, P <.001).

Furthermore, after examining the socio-economic status in the three groups, it reveals that women who had not agreed to participate in the study lived in a low socioeconomic status (χ2 = 15:27, P = .004). However, most of women declared an acceptable socioeconomic status (group 1: n = 373, 90.8%, group 2: n = 390, 90.7%; denial: n = 316, 83.2%).

Another difference between women not included in the study compared to the enrolled were about non-Italian nationality (χ2 = 63.1, P <.001). Overall, 1114 women (87.8%) were Italian (group 1: n = 393, 93.1%; group 2: n = 401, 92.6%; refuse : n = 320, 77.3%).

Instead, we didn’t find differences regarding number of pregnancies in the three groups ($\chi 2 = 4.98$, $P = 0.08$): 723 women (57.4%) were primiparous (G 1: n = 253, 61.6%, G2: n = 245, 56.8%; refuses: n = 225, 54.0%).

It wasn't possible to compare pharmacological treatment during the enrollment between women who had decided to participate in the study and those who had not accepted: in fact, only 25 (5.9%) had answered the question, declaring to non take drugs. In addition, 40 (10.0%) women in group 1 and 25 (5.8%) women in group 2 had reported taking drugs at the time of the interview.

Looking at conception mode we are not able to compare the women in the study and those who refused; the second one, in fact, only 41 had answered (2 cases of artificial insemination declared). In G 1 and G2 were reported respectively 8 cases and 2 cases of artificial insemination.

In G 1 were registered 31 cases of abortion, equal to 7.0%, in agreement with literature data (Regan & Rai, 2000).

Analysis of the EPDS and STAI scores in the first month postpartum

We have therefore pay attention at evaluation of G1 and G 2 for the first month post-partum. From the total scales of assessments administered, EPDS scores were examinated (Cox et al, 1987) to assess the subjective symptoms of depression, the STAI-Y (Spielberger et al, 1993) to assess the phenomenal anxious, the PDPI-R (Beck, 2002) to analyze the different risk factors.

We therefore compared the T4 assessment of 134 women recruited in the first month of pregnancy (G 1) and a T4 evaluation of 209 women recruited in the first

month postpartum (G 2), which at the time of analysis were entered into the database developed to collect data.

EPDS average score completed in the first month post-partum in G 1 was 3.37 (± 3.37), while G 2 scored 6.3 (± 4.2) (Table 2). Therefore, with the Student t test for independent samples we have found that in group 2 the mean scores dell'EPDS, compared with group 1, were statistically significantly higher (p <.000).

Furthermore, STAI mean scores during the first month postpartum were 45.4 ± (3.8) for group 1 and 44.6 (± 3.7) for group 2 (Table 2). The Student t test was performed for independent samples, and we didn't statistically significant differences between scores of two groups (p <.062) (Table 2).

Analysis of risk factors of PDPI-R to the first month postpartum

They examined the scores of PDPI-R (Beck, 2002) to analyze the risk factors of depression in post-partum.

We first compared the T4 assessment of 108 women recruited in the first month of pregnancy (G 1) and a T4 evaluation of 230 women recruited in the first month postpartum (G2).

PDPI-R mean scores completed in the first month post-partum, referring to the risk factors assessed during pregnancy, was 2.75 (± 2.8) in G 1, while in G2 was 3.83 (± 3.2) (Table 2). Therefore, with the Student t test for independent samples we have found that in G 2 the PDP-R mean scores than in group 1, were statistically significantly higher (p <.003).

PDPI-R average score completed in the first month post-partum, looking at risk

factors of pregnancy showed that post-partum, was 3.5 (± 3.4) in group 1, while in group 2 was found to be 4.95 (± 3.6) (Table 2) this difference that was statistically significant (p <.001). (Table 2).

We found a possible difference between the group recruited during pregnancy and the postpartum recruited regarding risk factors evaluated with the R-PDPI in first month post-partum. The dichotomous variables were analyzed using the $\chi 2$ test and the only two variables that differed statistically significantly between the two groups were not represented being married / cohabiting (Fisher's exact test, p = 0.044, OR = 4.35, 95% CI = 0.99-19.12) and the maternity blues ($\chi 2$ = 8.9, p <.003, OR = 1.96, 95% CI = 1:26 to 3:07), both conditions more likely in group 2.

However, it is not a statistically significant difference found about social status (p = 0.68, OR = 2.42, 95% CI = 0:29 to 20:36), depression during pregnancy ($\chi 2$ = 2.15, p = 0.14, OR = 1.73, 95% CI = 0.83-3.62), anxiety during pregnancy ($\chi 2$ = 2.36, p = 0.12, OR = 1.46, 95% CI = 0.89-2.38), planned pregnancy ($\chi 2$ = 0.46, p = 0.49, OR 1.17, CI = 95%. 074-1.84), not planned pregnancy ($\chi 2$ = 2.20, p = 0.14, OR = 1.83, 95% CI = 0.81-4.13) and previous depression ($\chi 2$ = 0,013, p = 0.91, OR = 0.97, 95% CI = 0.54 -1.72).

Regarding the item "Stress due to child care" and " child temperament" of PDPI-R post-partum, frequency analysis showed that 71.8% of G1 and 69.7% of G2 did not present difficulties related to "At the stress due to the care of the child", analyzing the individual factors of the item, difficulty with "children health problems" were present in 19.8% of 26% in G1 and G2 ; problems related to "child nutrition" were reported 7.6% in G 1 and 3% for G 2, while problems "with the baby sleep" were complaining in 0 .8% in G 1 and 1, 3% G 2 (Table 3).

Regarding Item "child temperament" there were no problems in 91% of G 1 and 82, 3% of G 2 respectevely; analyzing item like "irritability or capriciousness of the child " we found 6.1% in G1 and 10% in G2; difficulties related to item" the crying of the child" were in 1, 5% in G1 and 4.8% of G2. The Item regarding " difficulties related to comfort or soothe the child" scored 0 .8% and 3% in group 1 and group 2 respectevely.(Table 3).

We also compared not dichotomous risks factors by Student's t test for independent samples and found that women who were recruited during pregnancy,during the first month postpartum had a better self-esteem (F = 11.10, P = .001), better support from the partner (F = 36.49, P <.001), family (F = 13.73, P <.001) and friends (F = 4.55, P = 0.03) and reported less marital problems (F = 6.73, P = 0.01).

Analysis of the scores of the MAAS in pregnancy (T2, T3) and the MPAS to the first month postpartum

The total average score of the MAAS completed at the sixth month of pregnancy (T2) was 76.95 (± 6.3), while the eighth month of pregnancy (T3) the mean was 78.54 (± 6, 29). Looking at the subscale "MAAS Concern" was found an average of 28.12 (± 4.2) and 29.33 (± 4.21), respectively, at T2 and T3.

Considering the subscale "MAAS Quality", at T2, the average was 47.2 (± 3.29), while T3 was 47.71 (± 2.98) (Table 4).

MPAS average score completed at the first month postpartum in G1 was 79.52 (± 5.9), while in group 2 was 77.5 (± 6.2) (Table 4).

Therefore, with the Student t test for independent samples we have found that in group 1 the mean scores of MPAS, compared to group 2, were statistically

significant higher (p <.005) (Table 5).

The subscale "MAAS Concern" showed an average of 30.37 (± 4.0) in G 1 and 29.14 (± 3.9) in G 2 , and the difference was statistically significant (p <.007) in G1 (Table 5) . Regarding "MPAS Quality"subscale the average was 47.78 (± 3.3) in G 1 and 46.78 (± 3.9) in G 2, and G1 average scores were higher and statistically significant (p <.022) (Table 5).

LIMITATIONS OF THE STUDY

A limitation of our study is focused on the homogeneity of the sample.

The percentage of women who have achieved the diploma of secondary education, is significantly higher than the percentage of women who did not reach this degree.

This fact could affect the external validity of the study and minimize the results. Furthermore, many women are graduates and could be a for which they accept with more interest in the study.

Another limitation of this study, closely related to the earlier, is the fact that women who have denied their participation in the study had different sociodemographic characteristics than our sample, so in fact our screening was performed on a population women were mostly Italian, with a higher average socioeconomic status and level of education increased.

CONCLUSIONS

Over the past 50 years the studies about infant mental development underlined the crucial role of relationships between parents and children. Starting from the thought of Winnicott (1958) and Bowlby (1969) and the theory that described the child's innate tendency to seek closeness, attention and care of adult; they studied the importance of quality of the bond that the child develops to the figures. The primary relationships between infants and caregivers are considered of great importance for the psychic development in children. In the last two decades has developed a specific area of studies that explores the complex of attitudes, behaviors, cognitive representations and fantasies arise in the minds of parents regarding fetus, defined as prenatal attachment. The antenatal attachment construct was created by Cranley (1981) to describe the characteristics of the bond that parents develop during the pregnancy to the future child. Currently, this construct has been developed assuming that the quality of prenatal period influences on emotional processes of pregnancy, childbirth, the subsequent report of mother-child attachment and infant mental development. The scientists involved on this studies share the opinion that a good mother-infant relationship constitutes a basic condition for the prevention of disruption of the physical and mental development of children.

Regarding to the role played psychopathological factors related to the mother

attachment bond, as for example the presence of depressive symptoms, there are conflicting results: on the one hand in the studies of Mercer et al (1988) and Condon & Corkindale (1997) there appears to be associated with low maternal attachment, the other in the study by Priel & Besser (1999) was still found an association between attachment detected in the last trimester of pregnancy and the presence of depressive symptoms in the early eight weeks after delivery. Another study (Honjio et al, 2003) found no such association.

In our research we postulate the possible effects of maternal depression on mothers' perceptions about their attachment relationship and their children: we have noticed a negative correlation between the levels of attachment and depression values for the entire gestation period (up to T3) in agreement with the data of McFarland et al (2011). In particular, looking at the analysis of the qualitative aspects of attachment in the second and third trimesters of pregnancy, the data confirmed a negative correlation between attachment, depressive symptoms and risk factors for the entire period of pregnancy. Analysis of data about the period following childbirth, we found that women enrolled in the first month post-partum have an increased vulnerability and more risk factors for postpartum depression than women enrolled in the first month of pregnancy looking at the period of pregnancy ($p < .003$) and the postpartum period ($p < .001$).

Probably early screening and caregiving style of this study may have act as protective factors. Women enrolled in post -partum seem to have a different perception about respect to family support, support from friends and the partner, and seem to show more difficulty about health and sleep problems of their baby, and about children temperament. The women in group 2, as assumed from the data

of PDPI-R, were significantly more depressed than in group 1, presenting a worst attachment toward their child than the first group. There were no statistically significant differences between the two groups looking at the anxiety trait, maybe because in conjunction with delivery, the anxiety is transverse, regardless of the time of enrollment.

The literature data suggest that the basis of inadequate maternal-infant attachment in the post-partum depression may have its roots in pregnancy. Preliminary data of our study, which is the first, to our knowledge, which explores both pregnant and post-partum, seem to confirm this assumption and emphasize the importance of praecox screening of depressive symptoms to introduce from early stages of pregnancy. In this time, an early therapeutic intervention support can have a positive impact on post-partum depressive symptoms and, consequently, on the mother-child relationship as suggested by the scores of pregnant women enrolled in the MPAS that are significantly higher scores at total scores for the two subscales, "Quality" and "Concern", compared to women enrolled in the postpartum, indicating their more adequate attachment style.

Moreover these items are related to the development of psychic and somatic baby, quality prenatal attachment and becomes more evident, as well as the possibility of being able to monitor and encourage appropriate development through programs of primary prevention.

Carrying out antenatal screening of established risk factors and accurate evaluation of attachment during pregnancy may help to plan adequate treatment in order to prevent possible postpartum distress outcomes. Further studies are needed to

replicate our findings and to clarify the role of pre/post natal attachment during pregnancy and its link with Post-Partum Depression in order to identify a specific subgroup of women warranting special attention.

DISCUSSION

Many of the physiological sensations that occur during pregnancy are similar to depresive symptoms. These symptoms can be masked in pregnant women. For this reason it is essential that maternity clinics and general practitioners would be able to grasp the signs and underline mood disorder, subsequently they should address patients to a specialist. Furthermore, it's important to be able to recognize from a mild and manageable prenatal depression.

The changeover to parenthood and antenatal depression conditions require specific evaluation and treatment by a mental health professional as well as other authors have reported (Austin, 2003).

The pregnancy could be the ideal time for intervention to mitigate the suffering of the mothers and reduce long-term consequences of an untreated mental disorder (Austin et al., 2005, Glover and O'Connor, 2002).

The early detection of bad conditions and early treatment of depression are associated with a better outcome (Klein and Essex, 1995).

This study shows that prenatal screening can arise an accurate assessment of attachment during pregnancy and help to plan an appropriate treatment to prevent possible outcomes of discomfort after childbirth.

Currently, this construct is developed assuming that the emotional investment quality prenatal influences on the processes of pregnancy, childbirth, future parent-child attachment relationship, maternal health and infant mental development (Righetti et al. , 2005).

Further studies are needed to replicate our results and go from an initial fact-

finding investigation to a larger sample. This could clarify the role of maternal attachment during pregnancy and its relationship with postpartum depression, to identify a specific subgroup of women that justify special attention.

Tabs

Tab1. Schedule of Assessment

	T0	T1	T2	T3	T4	T5	T6	T7	T8
EPDS	X	X	X	X	X	X	X	X	X
STAI	X	X	X	X	X	X	X	X	X
MAAS			X	X	X		X		X
PDPI-R	X	X	X	X	X	X	X	X	X

T0, T1, T2, T3 (I, III, VI, VIII months of pregnancy); T4, T5, T6, T7, T9 (I, III, VI, IX, XII postpartum time)

Tab 2. socio-demographic charateristics of enrolled sample (n=946; Group 1: n=455; Group 2: n=491) vs not enrolled sample (n=417)

	Not enrolled pts (n=417)	Group1 (n=455)	Group 2 (n=491)	TEST
Age (mean ± SD)	32.58±5.70	32.75±4.84	33.35±4.81	**F=2.62, p=0.07**
Marital status n (%)				**χ^2=8.48, p=0.21**
Single	36 (8.9)	26 (6.2)	24 (5.5)	
Married/Convivente	353 (87.2)	381 (90.9)	389 (89.8)	
Separata/Divorziata	16 (4.0)	11 (2.6)	20 (4.6)	
Widow	0 (0.0)	1 (0.2)	0 (0.0)	
Employee n (%)				**χ^2=28.15, *p<.001**
Student	9 (2.2)	8 (1.9)	9 (2.1)	
Disoccupied	32 (8.0)	35 (8.4)	31 (7.2)	
clerk	228 (56.7)	262 (62.7)	263 (60.7)	
housewife	90 (22.4)*	46 (11.0)	56 (12.9)	
Self employed	43 (10.7)	67 (16.0)	74 (17.1)	
Education n (%)				**χ^2=99.64,**

				***p<.001**
Primary school	1 (0.3)	5 (1.2)	3 (0.7)	
College	163 (41.7)*	74 (17.7)	67 (15.5)	
High School	112 (28.6)*	206 (49.4)	210 (48.7)	
Graduate student	115 (29.4)	132 (31.7)	151 (35.0)	
Economic statusn (%)				**χ2=15.27, *p=.004**
Low	52 (13.7)*	33 (8.0)	34 (7.9)	
medium	316 (83.2)	373 (90.8)	390 (90.7)	
high	12 (3.2)	5 (1.2)	6 (1.4)	
Living Area n (%)				**χ2=6.0, p=0.19**
Urban	185 (46.6)	176 (42.5)	218 (50.8)	
Suburban	199 (50.1)	225 (54.3)	200 (46.6)	
Rural	13 (3.3)	13 (3.1)	11 (2.6)	
First pregnancy n (%)				
Yes	225 (54.0)	253 (61.6)	245 (56.8)	**χ2=4.98, p=.08**
No	192 (46.0)	158 (38.4)	186 (43.2)	
Nationality n (%)				**χ2=63.12, *p<.001**
Italian	320 (77.3)*	393 (93.1)	401 (92.6)	
Not italian	94 (22.7)	29 (6.9)	32 (7.4)	
Drug Tratment n (%)				
Yes	0 (0.0)	40 (10.0)	25 (5.8)	
No	25 (100.0)	360 (90.0)	408 (94.2)	
Deliveryn (%)				
Spontaneus	39 (95.1)	401 (98.0)	431 (99.5)	
Artificial insemination	**2 (4.9)**	**8 (2.0)**	**2 (0.5)**	

Tab 3 Mean scores EPDS, STAI-Y e PDPI-R, during pregnancy (GVD) and in postpartum (tot), and at I month PP (T4, T4bis) in the two subgroups.

	Gruppo	N	Mean	Std.Deviation	Sig.
EPDS tot (I monthPP) (N=343)	1	134	3,37	3,8	*.000
	2	209	6,37	4,2	
STAI-S tot (I month PP) (N=376)	1	136	45,45	3,8	.062
	2	236	44,69	3.7	
PDPI GVD (I month PP) (N=338)	1	108	2,75	2,8	*.003
	2	230	3,83	3,2	
PDPI PP (I monthPP) (N=335)	1	106	3,5	3,4	*.001
	2	229	4,95	3,6	

**Gruppo 1= T4 **Gruppo 2=T4bis*

Tab 4. Item postpartum PDPI-R al I month PP (T4, T4bis) in G1 and G2

Child care stress		T4	T4bis
	NO	71.8%	69.7%
1. Il suo bambino ha qualche problema di salute?		19.8%	26%
2. Ha problemi con la nutrizione del bambino?		7.6%	3%
3. Ha problemi col sonno del bambino?		0.8%	1.3%

Infant temperament		T4	T4bis
	NO	91.%	82.3%
1. Il suo bambino è irritabile o capriccioso?		6.1%	10%
2. Il suo bambino piange molto?		1.5%	4.8%
3. E' difficile consolare o calmare il suo bambino?		0.8%	3%

Maternity Blues		T4	T4bis
	SI	33.3%	49.6%

Tabella 5. Mean scores MAAS VI -VIII month of pregnancy (T2, T3)

	Gruppo	N	Mean	Std. Deviation
MAAS qual	T2	192	47,2	3,3
	T3	126	47,71	2,98
MAAS_worry	T2	192	28,12	4,2
	T3	126	29,33	4,21
MAAS_tot	T2	192	76,95	6,3
	T3	126	78,54	6,3

Tab 6. Mean scores MPAS I month PP (T4, T4bis) into the two groups

	Gruppo	N	Mean	Std. Deviation	Sig.
MAAS qual (I month PP) (N=350)	1	111	47,78	3,3	*.022
	2	239	46,78	3,9	
MAAS_worry (I monthPP) (N=350)	1	111	30,37	4,0	*.007
	2	239	29,14	3,9	
MAAS_tot (I month PP) (N=350)	1	111	79,52	5,9	*.005
	2	239	77,5	6,2	

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